



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/551,377	09/29/2005	Akinori Taira	276447US2PCT	3144
22850	7590	09/12/2007	EXAMINER	
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			MITCHELL, NATHAN A	
		ART UNIT		PAPER NUMBER
		2609		
		NOTIFICATION DATE		DELIVERY MODE
		09/12/2007		ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com  
oblonpat@oblon.com  
jgardner@oblon.com

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/551,377	TAIRA ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Nathan Mitchell	2609	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 29 September 2005.
- 2a) This action is FINAL.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 18-37 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 18-37 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 29 September 2005 is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All    b) Some \* c) None of:
  1. Certified copies of the priority documents have been received.
  2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)	4) <input type="checkbox"/> Interview Summary (PTO-413)
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	Paper No(s)/Mail Date. _____
3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date <u>9/29/2005, 5/23/2007</u> .	5) <input type="checkbox"/> Notice of Informal Patent Application
	6) <input type="checkbox"/> Other: _____

## DETAILED ACTION

### *Specification*

1. The abstract of the disclosure is objected to because it is more than 150 words.

Correction is required. See MPEP § 608.01(b).

### *Priority*

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### *Information Disclosure Statement*

3. The information disclosure statements (IDS) submitted on 9/29/2005 and 5/23/2007 are in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statements are being considered by the examiner.

### *Claim Rejections - 35 USC § 102*

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 18 and 28 are rejected under 35 U.S.C. 102(b) as being anticipated by “Adaptive Modulation using Space-Time Block Code Matrix” to Niida et al.

For claim 18, Niida et al. disclose a radio communication apparatus at a transmission side (the box on the top left side with transmit antennas in fig. 2) that includes a plurality of transmission antennas (translation page 5 line 4) and performs a communication using at least one carrier (inherent), the radio communication apparatus comprising:

A channel dividing unit (must be box on left given functions that are performed) that divides a transmission signal (signal entering box on left) into a plurality of channels (fig. 2 each path between receive and transmit antennas can be considered a channel) based on channel structure information (the number of transmit antennas) indicating a method of structuring a multiple-input-multiple-output channel (translation page 6 lines 12-14) informed from a communication apparatus at a reception side (illustrated in feedback from receiver in fig. 2); and

A space-time coding unit (inherent in fig. 2) that realizes transmission diversity (through the use of multiple antennas in fig. 2) by performing a space-time-coding processing for each of the channels divided (formula 4).

**Claim 28** is rejected for the same reason as claim 18 as the radio communication apparatus is a transmitter.

6. Claims 20, 21, 30, and 31 are rejected under 35 U.S.C. 102(b) as being anticipated by "MIMO Channel Transmission With Antenna Selection and Optimum Power Allocation" to Ji et al.

For **claim 20**, Ji et al. disclose a radio communication apparatus (fig. 1 right side) that includes at least one reception antenna (fig. 1 #1 through #M) and performs a communication using at least one carrier (inherent), the radio communication apparatus comprising:

A channel estimating unit (fig. 1 channel estimator) that estimates a channel gain between a transmission side and the reception side (translation page 2 lines 18-19); and

A channel-structure determining unit (fig. 1 antenna selection and power allocation calculator) that determines a structure of a multiple-input-multiple-output channel (translation page 3 lines 14-17) based on a result of estimation of the channel gain (translation page 2 lines

Art Unit: 2609

20-22), a physical configuration of a communication apparatus at the transmission side (translation page 2 line 24-page 3 line 2), and a physical configuration of the radio communication apparatus (translation page 2 lines 18-19 can be considered to read on this limitation given the dependence of the response on the receive antennas), and informs channel structure that is a result of determination to the communication apparatus at the transmission side (translation page 3 lines 14-17).

For claim 21, Ji et al. disclose the radio communication apparatus according to claim 20, wherein the channel-structure determining unit generates the channel structure information (translation page 3 lines 14-17) based on at least one of the result of the estimation of the channel gain, number of antennas of the communication apparatus at the transmission side and the radio communication apparatus, and a computational capability of the communication apparatus at the transmission side and the radio communication apparatus (channel gain in particular see translation page 2 lines 20-22),.

For claim 30, the radio communication apparatus in claim 20 can be considered a receiver as it receives data from what can be considered a transmitter (fig. 1 transmitted through #1 through #N). Thus claim 30 is rejected for the same reason as claim 20.

Claim 31 is rejected for the same reason as claim 21.

#### *Claim Rejections - 35 USC § 103*

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 2609

8. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claims 22, 23, 32 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ji et al. in view of JP 2000-188585 to Hiroaki et al.

For claim 22, Ji et al. discloses all the subject material of the claimed invention but does not disclose a coherent-band width measuring unit as recited in claim 22 or the channel estimating unit dividing a signal band into a plurality of subcarrier groups based on a measurement of the coherence bandwidth or further performing estimation of the channel gain in units of a subcarrier group.

Official notice is taken that it is well known to use a coherence bandwidth monitoring unit that measures a received signal and uses that to inform a decision of how to divide a signal

Art Unit: 2609

band into subcarrier groups. It would have been obvious to one of ordinary skill in the art at the time of invention to combine this with the receiver as taught by Ji et al. One skilled in the art could integrate this unit and modify the receiver to work with it and then further modify the channel estimating unit to enable subdivision of the frequency band. The motivation for doing this is signal diversity as given by U.S. Patent No. 7,248,841 B2 to Agee et al. (column 23 lines 3-8).

Hiroaki et al. disclose a multi-antenna system wherein the received power of subbands is measured (translation paragraph 99) and used to inform a selection of transmit antennas (translation paragraph 101). It would have been obvious to one of ordinary skill in the art at the time of invention to combine this teaching with that of Ji et al. One skilled in the art could easily employ the hardware used by Hiroaki et al. to perform channel gain estimation as a measurement of channel gain is simply the transmit power divided by the received power for the purposes of decision making the measurements are equivalent. The motivation for making these changes is to improve performance.

For claim 23, Ji et al. as modified in claim 22 discloses all the subject material of the claimed invention with the exception of the channel estimating unit averaging results of the estimation. Hiroaki et al. further discloses using the average receive level to inform an antenna decision (translation page 5 lines 20-22). It would have been obvious to one of ordinary skill in the art at the time of invention to use average results. As has been previously stated, the use of the reception levels as opposed to the gain is equivalent and it is well known to transpose them. One skilled in the art would be motivated to use an average to improve precision of antenna selection (translation paragraph 113 lines 2-3).

**Claims 32 and 33** are rejected for the same reasons as claims 22 and 23 respectively.

11. Claims 19 and 29 rejected under 35 U.S.C. 103(a) as being unpatentable over Niida et al. in view of “Eigenbeam-Space Division Multiplexing (E-SDM) in a MIMO Channel” to Miyashita et al.

For **claim 19**, Niida et al. fails to teach the features of a beam forming unit and an adding unit. In a related field of endeavor, Miyashita et al. teach a beam forming unit (fig. 1 part of box “multibeam forming+TX power control”) that performs an individual direction control by a complex multiplication (translation page 5 line 25) with respect to each of the channels to which the space-time coding processing is performed (translation page 5 line 20-paths between xmit/recv antennas can be considered channels), and distributes the channels for each of the transmission antennas (translation page 5 line 25 inherent given that the multiplication takes place); and an adding unit that adds all of the transmission signals to which the direction control is performed (inherent in fig. 1 multibeam forming as the equation 5 is transmitted) corresponding to each of the transmission antennas. It would have been obvious to one of ordinary skill at the time of invention to combine the teachings of Miyashita et al. with those of Niida et al. This could be done by integrating the beamforming technology into the transmitters. The motivation for doing this is to increase capacity (translation page 5 line 14).

**Claim 29** is rejected for the same reason as claim 19 as the radio communication apparatus of Niida et al. can be considered to be a transmitter.

12. Claims 24, 25, 34 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Niida et al. in view of Ji et al.

Art Unit: 2609

For **claim 24**, all subject matter of the claimed invention is disclosed in either claim 18 or 20. It would have been obvious to one of ordinary skill in the art at the time of invention to combine the teachings of Niida et al. and Ji et al. The transmission-processing unit could be easily modified to work with the feedback provided by the reception-process unit. The motivation for the combination is to allow communication.

**Claim 25** is rejected for the same reason as claim 21.

**Claim 34** is rejected for the essentially the same reason as claim 24 as the combination in claim 24 can be considered to be a radio communication system comprised of a transmitter and a receiver.

**Claim 35** is rejected for the same reason as claim 31.

13. Claims 26, 27, 36 and 37 rejected under 35 U.S.C. 103(a) as being unpatentable over Niida et al. in view of Ji et al. as applied to claims 25 and 35 above, and further in view of Hiroaki et al.

**Claim 26** is rejected for the same reason as claim 22.

**Claim 27** is rejected for the same reason as claim 23.

**Claim 36** is rejected for the same reason as claim 32.

**Claim 37** is rejected for the same reason as claim 33.

### *Conclusion*

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
US-6,377,631 B1	04-2002	Raleigh, Gregory G.	375/299
US-2003/0043887 A1	03-2003	Hudson, John E.	375/144

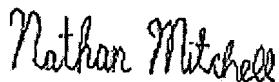
Art Unit: 2609

US-2003/0185174 A1	10-2003	Curryan et al.	370/335
US-6,731,618 B1	05-2004	Chung et al.	370/328
US-2004/0121753 A1	06-2004	Sugar et al.	455/333
US-6,760,388 B2	07-2004	Ketchum et al.	375/295
US-6,771,706 B2	08-2004	Ling et al.	375/267
US-2004/0240378 A1	12-2004	Kei Ng et al.	370/206
US-7,248,841 B2	07-2007	Agee et al.	455/101

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nathan Mitchell whose telephone number is (571)270-3117. The examiner can normally be reached on Monday through Friday 7:30 AM to 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dang Ton can be reached on (571)272-3171. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Nathan Mitchell/nam

DANG T. TON  
SUPERVISORY PATENT EXAMINER